

NAVAIR DEPOT JAX RELEASED

10 SEP 2002

P-3 LES FST-421

Canceled P-3 LES 22-0-0050 and P-3 LES 22-0-005A

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**DEPARTMENT OF THE NAVY
Naval Aviation Depot
Naval Air Station
Jacksonville, FL 32212-0016**

Code: 4.3.4.4
WUC: 1122A
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TITLE: P-3 Local Engineering Specification

IDENTIFICATION: LES/JX P3 FST-421

CLASSIFICATION: Conditional

SYSTEM: Airframe

SUBJECT: SOL-GEL SURFACE PREPARATION OF P-3 EMPENNAGE LEADING EDGES FOR ADHESIVE BONDED REPAIRS

REF: (a) NAVAIR 03-25EK-11
(b) P-3 LES NW 03-25EK-11/AL 22-0-0050
(c) P-3 LES NW 03-25EK-11/AL 22-0-005A
(d) NADEP JAX INST 4855.2J
(e) LPS/JX 746

Encl: NONE

1. **PURPOSE:** To provide specific process requirements for the application of a sol-gel surface treatment during adhesive bonded repairs to P-3 empennage leading edges performed in accordance with reference (a).

2. **CANCELLATION:** References (b) and (c) are canceled.

3. **BACKGROUND INFORMATION:** Reference (a) is the intermediate and depot maintenance manual for the P-3 empennage leading edge assemblies. References (b) and (c) established repair procedures and damage limits for the leading edges. Information contained in references (b) and (c) was picked up during last revision of reference (a). Current adhesive bonded repair procedures in reference (a) require the use of Pasa-Jell 105 which contains strong acids and hexavalent chromium compounds and a sprayable, solvent based, strontium chromate containing adhesive primer. Another aluminum bonding surface preparation procedure using sol-gel technology has been developed that provides greater environmental durability than Pasa-Jell 105 and does not contain strong acids or hexavalent chromium. The use of the sol-gel procedure will eliminate depot disposal costs for the chromate containing waste stream associated with the Pasa-Jell 105 used in P-3 empennage leading edge repairs. The use of a brushable primer in place of the sprayable primer per reference (a) provides for improved process safety.

4. **APPLICATION:** All P-3 empennage leading edge assemblies repaired at NADEP Jacksonville in accordance with reference (a).

5. **SPECIAL TOOLS AND TEST EQUIPMENT:** NONE

6. SPECIAL MATERIALS:

6.1 White Aluminum Oxide, #3 Powder (50 micron), P/N 77053AB, CAGE 6R592

6.2 AC 130 Sol-Gel Kit, Cage 1DWR5

6.3 Adhesive Primer, EC3924B, CAGE 0KHE3

6.4 Adhesive Primer, BR6747-1, CAGE 07542

6.5 Adhesive Film, AF163-2K 0.06 psf, CAGE 0KHE3

6.6 Cleaning cloth, AMS 3819 Type 1 Grade A, NSN: 7920-01-004-7847

7. EFFECTIVE DATE: As indicated on the Technical Data Release Card

8. INSTRUCTIONS:

CAUTION

Only trained individuals/artisans shall perform the bonded repairs in accordance with this directive. Special skills certification per reference (d) is required. Failure to correctly accomplish procedures in this directive could result in unacceptable reductions in aircraft mission capability.

WARNING

This instruction requires the use of hazardous materials, operations, and equipment, which necessitate special safety precautions. Consult the applicable Material Safety Data Sheet (MSDS) before beginning the process. Contact the NAVAIRDEPOT NAVOSH OFFICE (CODE 6.8.1) for guidance regarding personal protective equipment and other health and safety precautions.

NOTE

Bonding failures are most often associated with contamination. During all bonding operations, clean gloves approved for adhesive bonding operations shall used for each step to minimize contamination.

8.1 Remove damage and manufacture appropriate repair doublers per WP 005 00 of reference (a). Remove surface contaminants from areas to be bonded and adjacent surfaces by solvent wiping with isopropyl alcohol (TT-I-735) and clean cotton cloth (AMS 3819 Type I Grade A).

NOTES

1. Sol-gel coating should be applied as soon as possible after completion of grit blast process. Time between completion of grit blast process and application of sol-gel shall not exceed 30 minutes.

2. Sol-gel solution **must** be prepared prior to grit blasting. There is a required 30 minute induction time after mixing prior to use. The pot life of the mixed sol-gel solution is 10 hours after 30 minute induction time.

8.2 Deoxidize surfaces to be bonded by grit blasting with 50 micron white aluminum oxide (paragraph 6.1) until a uniform matte appearance is obtained. Grit blast an area slightly larger than the area to be bonded.

8.3 Remove loose blasting residue/grit with clean, oil-free compressed air.

8.4 Apply sol-gel solution prepared per paragraph 8.10 to surfaces with a natural bristle brush or by spraying with HVLP spray equipment.

8.4.1 When brushing the sol-gel solution, shake the solution for a minute and then pour the estimated amount of required solution into a clean container. Dip the brush into this container. Do not dip the brush into the original container and contaminant solution.

8.4.2 Apply solution generously, allowing excess to run off the surface. Keep the surfaces continuously wet with solution for a minimum of 3 minutes.

8.4.3 Part surfaces must not be allowed to dry during the solution application period and should be covered with fresh solution at least five times during the application period.

8.4.4 For large areas, treat smaller sections at a time for the minimum application time, progressing over the entirety of the part to ensure that treated surface is not drying out between brush/spray coats. It is easier to apply sol-gel solution to a large area by spray than by brush.

8.5 Allow the coated surfaces to drain for five minutes. If there is any surplus sol-gel solution that has collected in crevices, pockets, or other contained areas, use filtered compressed air to lightly blow off excess solution while leaving a wet film behind. Do not splatter this excess solution onto adjoining surfaces. Alternatively, the excess sol-gel solution may be gently blotted, not rubbed/wiped, off the surface using a clean cotton wiper that has been prewetted with the sol-gel solution. Do not dry off areas that are able to freely drain. The part may still be wet after only 5 minutes of air-drying.

8.6 Let the sol-gel coated parts dry under ambient conditions (temperature shall be 75±10°F and relative humidity shall not exceed 85 %) for a minimum of 60 minutes. Minimize contact with the part during the drying time, as the coating may be easily damaged until fully cured.

8.7 An acceptable sol-gel coating is smooth and continuous without evidence of water breaks or other evidence of surface contamination. Dark areas caused by draining and uneven drying of the sol-gel solutions are acceptable.

8.8 Apply EC3924B primer (paragraph 6.3) as soon as possible after sol-gel treatment but within two hours of 60 minute dry time completion. Apply primer to a dry film with a 0.00005 to 0.00015 inch thickness. Alternately, the water based sprayable primer BR6747-1 (paragraph 6.4) may be applied per reference (e)

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8.8.1 Prior to use the primer EC3924B must be warmed to ambient temperature and thoroughly agitated to redisperse the pigmentation which settles on storage.

8.8.2 Allow applied primer to air dry a minimum of 2 hours at $80 \pm 10^\circ\text{F}$.

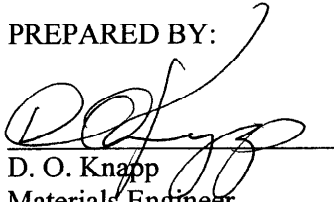
8.9 Assemble primed components with AF163-2K adhesive film (paragraph 6.5). Co-cure adhesive film and primer at a bondline temperature of $250 \pm 10^\circ\text{F}$ for 70 ± 10 minutes. Bonding pressure of 20 ± 5 psi should be applied.

8.10 Prepare sol-gel solution (paragraph 6.2) according to manufacturer's instructions.

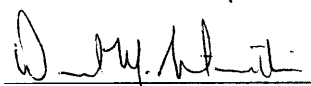
8.10.1 Use kit size appropriate for size of area to be treated. For example, 100 milliliters of sol-gel is enough to coat about 2 square feet.

8.10.2 Clearly label the sol-gel solution with the allowed application period or pot-life after mixing components (10 hours + 0.5 hour induction time).

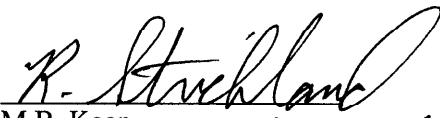
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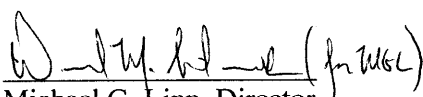
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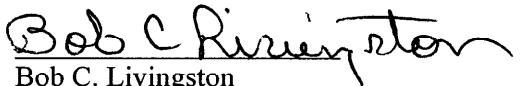
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